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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,937	02/12/2004	Katsuhiko Takeuchi	1990.69695	5512

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EXAMINER

ABAD, FARLEY J

ART UNIT	PAPER NUMBER
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2181

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/777,937	Applicant(s) TAKEUCHI ET AL.	
	Examiner FARLEY J. ABAD	Art Unit 2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 17-34 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>02/12/2004, 04/28/2009, 10/01/2009</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of claims

1. Claims 1-34 are pending in the present application.

Election/Restrictions

2. Applicant's election with traverse of Group 1 (claims 1-19) in the reply filed on 10/19/2009 is acknowledged. The traversal is on the ground(s) that the claims of Groups I and II make the search significantly overlapping and would not be a serious burden to the examiner to examiner Groups I and II together. This is not found persuasive because although Groups I and II recite similar limitations such as a receive FIFO, a receive task file register, etc..., the functionality recited in claim 20 differs greatly compared to claim 1. For example, claim 20 is directed towards outputting a head signal in synchronism with input and output of headmost data of the packet and outputting a tail signal in synchronism with input and output of endmost data of the packet, halting data input by an error during data transmission, outputting the one unit of data staying in the send FIFO together with the tail signal and causing a data packet to be transferred to the host. Claim 1 makes no mention of claim 20's recited functionality and does not mention a head signal, a tail signal, headmost data, endmost data, error during transmission, etc. Therefore a burden would fall on the examiner in performing the search.

In addition, when making the restriction requirement, the examiner inadvertently included independent claim 17 and dependent claims 18-19 in Group 1 when claims 17-

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19 should have been included in Group 2 (claims 20-22). Independent claims 17 and 20 contain similar subject matter, the only difference being claim 17 drawn to a method rather than a device. Applicant's arguments regarding claim 20 would also be applicable to claim 17, therefore claim 17 will not be considered for the same reasons mentioned above. The examiner attempted to contact applicant's representative by telephone regarding the matter however, applicant's representative was not available.

The requirement is still deemed proper and is therefore made FINAL.

Priority

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. JP 2003-334986, filed on 09/26/2003.

Information Disclosure Statement

4. The information disclosure statement (IDS) submitted on 02/12/2004, 04/28/2009, 10/01/2009 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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6. Claims 1, 3, 5, 7, 9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludwig, U.S. Patent No. 6,765,889 B1, and further in view of Nookala et al (hereinafter Nookala), U.S. Patent No. 6,323,867 B1.

As per claims 1, 5, 9, and 13, taking claim 1 as exemplary, Ludwig discloses a device interface apparatus having a physical layer, a link layer, a transport layer and an application layer [col. 6, lines 43-44, the set of protocols may be the TCP/IP protocol suite or any other set of protocols], for transferring commands and data in packet format by serial transmission [fig. 6, col. 6, lines 26-33, transferring data packets] between a device [fig. 6, C1] and a host [fig. 6, box with broken lines CS], the interface apparatus comprising:

a receive storage means [col. 13, lines 25-29, C1 is arranged to transmit and receive data packets via; lines 62-64, C3 sends data packets to C1] disposed at the transport layer and storing a command packet or a data packet received from the host via the physical layer and the link layer [col. 13, lines 25-29, C1 is arranged to transmit and receive data packets via; lines 62-64, C3 sends data packets to C1];

a send task file register disposed at the application layer and loading a command or data for packet sending [col. 6, lines 51-56, data packets are loaded into C1 for sending to C3; col. 13, lines 59-62, C1 sends data packets to C3];

a send storage means [fig. 6, temporary storage means S1] disposed at the transport layer and storing the content of the send task file register [col. 6, lines 6-66, before transmission, said data packets may be stored in S1; col. 14, lines 1-4], the send

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storage means causing a command packet or a data packet to be sent to the host via the link layer and the physical layer [col. 13, lines 59-62];

an available time generation unit generating an available time for receiving another command packet from the host during data transfer [col. 13, lines 63-64, col. 7, lines 60-65; feature is implied, C1 receives packets hence it has generated available time]; and

a mid-transfer command processing unit, when a command packet is received from the host during the available time, suspending the data transfer to decode the received command for execution of processing and thereafter resuming the data transfer [col. 12, lines 9-23, transmission of data is halted upon receiving the interrupt message and the data transfer is resumed thereafter].

Ludwig does not explicitly disclose a receive FIFO storing on a first-in first-out basis;

a command detection circuit detecting the command stored in the receive FIFO during data transfer and outputting a command detection signal;

a receive task file register disposed at the application layer and loading the command content of the receive FIFO;

a send FIFO storing on a first-in first-out basis.

However, Nookala discloses a receive FIFO storing on a first-in first-out basis [col. 6, lines 37-45, command FIFO buffer];

a command detection circuit detecting the command stored in the receive FIFO during data transfer and outputting a command detection signal [col. 6, lines 37-45, detecting a command rather than data];

a receive task file register disposed at the application layer and loading the command content of the receive FIFO [col. 6, lines 45-57, data words of a command are stored in FIFO buffers];

a send FIFO storing on a first-in first-out basis [fig. 6, DM FIFO 604].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to improve upon Ludwig by implementing a receive FIFO storing on a first-in first-out basis; a command detection circuit detecting the command stored in the receive FIFO during data transfer and outputting a command detection signal; a receive task file register disposed at the application layer and loading the command content of the receive FIFO; a send FIFO storing on a first-in first-out basis, because it would provide the enhanced capability of high capacity and fast access command queuing [col. 2, lines 16-19].

As per claims 3, 7, 11, and 15, taking claim 3 as exemplary, Ludwig discloses the interface apparatus according to claim 1, wherein the available time generation unit detects completion of the transfer of the data packet sent to or received from the host to thereby set certain available time [col. 12, lines 9-26, detecting completion of received packet to set available time].

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7. Claims 2, 4, 6, 8, 10, 12, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ludwig, in view of Nookala, and further in view of Gaur et al (hereinafter Gaur), U.S. Publication No. 2002/0144004 A1.

As per claims 2, 6, 10, and 14, taking claim 2 as exemplary, the modified Ludwig does not explicitly disclose the interface apparatus according to claim 1, wherein the mid-transfer command processing unit is firmware implemented by execution of a program, and wherein the mid-transfer command processing unit comprises: a suspend processing unit, when the command detection signal is output from the command detection circuit for the command packet received during the available time and stored in the receive FIFO, suspending the currently executed data transfer and saving parameters upon the suspension into a memory; a command decode unit decoding the command content loaded from the receive FIFO into the receive task file register; a data transfer abort unit, when abortion of the data transfer is determined by the command decode unit, discarding the currently executed command and the saved parameters and terminating the data transfer; and

a transfer resume unit, when continuance of the data transfer is determined by the command decode unit, throwing the command content of the receive task file register into a command queue, storing command reception response information into the send FIFO and sending a command reception response packet to the host via the link layer and the physical layer, the transfer resume unit thereafter releasing the suspend of the data transfer and setting the saved parameters to resume the data transfer.

However, Gaur discloses a suspend processing unit, when the command detection signal is output from the command detection circuit for the command packet received during the available time and stored in the receive FIFO, suspending the currently executed data transfer and saving parameters upon the suspension into a memory [paragraph 0004, upon interrupt, saving the current context]; a command decode unit decoding the command content loaded from the receive FIFO into the receive task file register [paragraph 0004, executing interrupt service routine]; a data transfer abort unit, when abortion of the data transfer is determined by the command decode unit, discarding the currently executed command and the saved parameters and terminating the data transfer [paragraph 0004, aborting a lower priority interrupt]; and

a transfer resume unit, when continuance of the data transfer is determined by the command decode unit, throwing the command content of the receive task file register into a command queue [paragraph 0004, restoring necessary information to resume execution of code], storing command reception response information into the send FIFO and sending a command reception response packet to the host via the link layer and the physical layer, the transfer resume unit thereafter releasing the suspend of the data transfer and setting the saved parameters to resume the data transfer [paragraph 0004, restoring necessary information to resume execution of code].

One of ordinary skill in the art at the time of applicant's invention would have clearly recognized that it is quite advantageous for the Ludwig apparatus to include a suspend processing unit, when the command detection signal is output from the command detection circuit for the command packet received during the available time

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and stored in the receive FIFO, suspending the currently executed data transfer and saving parameters upon the suspension into a memory; a command decode unit decoding the command content loaded from the receive FIFO into the receive task file register; a data transfer abort unit, when abortion of the data transfer is determined by the command decode unit, discarding the currently executed command and the saved parameters and terminating the data transfer; and a transfer resume unit, when continuance of the data transfer is determined by the command decode unit, throwing the command content of the receive task file register into a command queue, storing command reception response information into the send FIFO and sending a command reception response packet to the host via the link layer and the physical layer, the transfer resume unit thereafter releasing the suspend of the data transfer and setting the saved parameters to resume the data transfer because it would provide Ludwig with the enhanced capability of reducing latency [paragraph 0013].

As per claims 4, 8, 12, and 16, taking claim 4 as exemplary, Ludwig discloses the interface apparatus according to claim 2, wherein the transfer resume unit rewrites the data stored in the send FIFO upon suspending of data transfer into response data to the received command for transfer of a command reception response packet, the transfer resume unit thereafter setting the saved parameters to resume the data transfer [col. 7, lines 28-46, resuming data transfer by sending the contents of the temporary storage means].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FARLEY J. ABAD whose telephone number is (571) 270-3425. The examiner can normally be reached on Monday-Friday 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alford Kindred can be reached on (571) 272-4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. J. A./
Examiner, Art Unit 2181

/Alford W. Kindred/
Supervisory Patent Examiner, Art
Unit 2181